



MACHAKOS UNIVERSITY

University Examinations 2019/2020 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

University Supplementary Examinations

ACU 201-INTRODUCTION TO STATISTICS IN SOCIAL SCIENCES

Date:

Time:

Instruction: Attempt question ONE and any other TWO questions

QUESTION ONE (30 MARKS)

- (a) Explain the meaning of the following terms as applied in Statistics
- (i) Sample
 - (ii) Variable
 - (iii) Data (6 marks)
- (b) Differentiate between each of the following terms:
- i) Descriptive and inferential statistics
 - (ii) Discrete and Continuous variable
 - (iii) Point and interval estimation (6 marks)
- (c) The data below relates to the number of successful sales made by a salesmen employed by a large marketing firm in a particular quarter

No of sales	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29
No of salesmen	1	14	23	21	15	6

Calculate the mean and standard deviation

(7marks)

- d) A college collects the following set of data on the number of credits C that a randomly selected group of students carry and the number of hours H that they work during the week

H	20	25	30	50	20	23
C	3.4	3.0	2.8	2.4	2.9	2.9

Determine the rank correlation coefficient based on these data (6marks)

- e) A study of 49 randomly chosen 8-year olds shows that watch television an average of 38 hours per week with standard deviation of 6.4 hours. Assuming normal distribution, construct a 99% confidence interval for the average time per week that all such children watch television (5 marks)

QUESTION TWO

A Healthy organization is concerned about the high cost of producing many of its programs. A study is conducted to relate the production costs for 30 minutes of programming (in hundreds of thousands of dollars) to the ratings that the program gets in the national ratings survey. The results are shown below:

Production cost	1.2	1.6	1.8	2.5	2.7	3.0	3.5	4.4
Ratings	3.3	3.9	5.7	4.2	4.5	8.2	6.1	4.6

- Calculate the correlation coefficient between the production cost and the ratings (10 marks)
- Interpret the results in (i) above (2marks)
- Determine the least squares regression equation relating the ratings to the production costs (6marks)
- Using the regression line obtained in (iii) above estimate the ratings when the costs is 6.5 dollars. (2marks)

QUESTION THREE

The data below shows the number of hours worked in one week by employees in certain non-governmental organization (NGO):

46.3 39.2 44.2 41.3 45.1 42.3 43.5 40.0
 45.6 40.6 42.0 42.6 45.6 39.5 43.1 39.7
 46.1 38.9 42.4 42.1 45.0 44.4 42.4 40.8

- (a) Tabulate a frequency distribution table with class intervals by 38.9 – 40.4, ... etc
 (6 marks)
- (b) Use the table in 2(a) above to calculate the:
- (i) Quartile deviation (6 marks)
- (ii) Mode (4 marks)
- (iii) Median (4 marks)

QUESTION FOUR

(a) Explain the meaning of the following sampling techniques:-

- (i) Simple Random sampling
- (ii) Stratified sampling
- (iii) Judgmental sampling
- (iv) Cluster sampling
- (v) Multistage sampling (10 marks)

(b) The following frequency distribution the lower quartile is 44.5. Determine the values of *a* and *b*

Class	Frequency
30-34	7
35-39	12
40-44	a
45-49	b
50-54	38
55-59	15
60-64	8
	$\Sigma f = 200$

(10 marks)

QUESTION FIVE

(a) State and explain the four measurement scales for statistical data as outlined by Stevens (1946) (8marks)

(b) The following table shows the number of household members in certain town in 2010

No of House hold Members	Percentage
1	18
2	32
3	20
4	19
5	7
6or more	4

i. Calculate the mean and standard deviation of the number of households. (7 marks)

ii. Assuming the data is based on a single random sample of 445; calculate a 95% confidence interval for the mean household size. (5 marks)